

Central Intelligence Agency



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DIRECTORATE OF INTELLIGENCE

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Modernizing Chinese Telecommunications: The Role of Foreign Technology

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SUMMARY

Acquisition of foreign technology remains a key element of China's plans to modernize its telecommunications. Over the last several years, Japan has been China's major supplier, but other countries are competing fiercely to expand their share of China's telecommunications market, increasingly using low-cost financing to capture Beijing's business. Imported technology will greatly boost Chinese capabilities, although we believe continuing problems in procuring and assimilating foreign equipment and technology will slow the modernization. China and COCOM members will continue to press for further liberalization of export controls on telecommunications equipment.

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This memorandum was prepared by Office of East Asian Analysis. Information available as of 9 May 1986 was used in its preparation. Comments and queries are welcome and may be directed to the Chief, Development Issues, China Division, OEA,

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Modernization Goals

China's goals for telecommunications modernization during the Seventh Five-Year Plan (1986-90) are ambitious, especially compared to its recent achievements. China plans to:

- Expand and improve the telephone system, especially in key cities and coastal areas.
- Upgrade the entire telecommunications network.
- Develop a communications satellite system.

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Acquisition of foreign telecommunications equipment and technology is crucial to China's modernization strategy. Although China has progressed in research, Chinese officials and foreign observers agree that production is hampered by poor quality and limited availability of components, equipment shortages, an unskilled work force, poor management, and lack of familiarity with sophisticated production processes. The low level of indigenous technology and the sheer size of demand (see insert) also dictate acquiring additional equipment and production capacity from abroad. The Chinese produce mostly analog equipment, for example, while they plan to convert to digital telecommunications for high-speed data transmission and secure communications.

Improving the Telephone System

The waiting list for a telephone numbers more than 100,000 nationwide, and presumably would be even longer if applicants thought they could reasonably hope for installation. According to public statements by Chinese officials, China intends to increase the number of telephones from about 5 million in 1985 to 13 million in 1990 and 33 million in the year 2000--a significant investment of money, resource and personnel. The addition of 28 million over 15 years would require, on average, 1.86 million installations per year, more phones than were installed over the past five years combined. China also plans to install 60,000 new long-distance trunks during the Seventh Five-Year Plan, four times the number installed during the Sixth Plan period. We believe China's claims for the Sixth Five-Year Plan are exaggerated and that plans for 1986-90 are beyond China's capabilities.

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Recent Technology Acquisitions

China's approach to telecommunications modernization calls for advanced technology to meet priority needs and equipment based on older technologies for other

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requirements. Although willing to purchase equipment for some priority uses, Beijing prefers to buy manufacturing machinery in order to improve China's ability to produce its own equipment. Priorities are fiber optics, advanced switching, and satellite communications; China also wants pulse-code modulation devices and microwave and multiplexing technology. []

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Telephone Switching

China is still producing outdated crossbar switches; one of the key projects completed under the Sixth Five-Year Plan was the installation of crossbar exchanges in the new Beijing telephone exchange. China announced production of its first microprocessor-controlled switch in mid-1985, but we have no further details. China has purchased central office switches and private branch exchanges from a variety of foreign suppliers, but it is most interested in acquiring production equipment and technology. A 1983 agreement with a Belgian firm (a subsidiary of ITT) for the purchase of 100,000 lines of digital switching and establishment of a joint venture to produce 300,000 lines of switching annually represents a significant upgrading of Chinese capabilities. In 1985, Beijing concluded a second major agreement, with the French firm Alcatel-Thomson, for 100,000 lines of digital switching and an associated software center. Sweden, West Germany, Switzerland, Italy, and the Netherlands have also supplied telephone switching and related equipment. Press reports suggest China is interested in perhaps one other major purchase of switching technology. []

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Fiber Optics

The Chinese have made progress in its research on fiber optics, although we believe they are experiencing problems in key areas such as single-mode optical fibers, transmission devices, and large-scale production. [] Chinese officials are frustrated by the pace of development in the industry. China has several dozen short fiber optic lines, according to Chinese press reports, most of which are 8.5 megabits/second, although they do claim some are 34 megabits/second. []

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In the past two or three years, however, China has signed agreements with several foreign suppliers for high-speed 140 megabits/second intercity fiber optic transmission systems, and for technology, equipment, and training to produce fiber optic cable and components. Suppliers include the United Kingdom, Japan, the United States, and the Netherlands. []

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[] UK or other Western assistance would result in a faster, more extensive network deployed sooner than if the Chinese were to develop the capability on their own. The sale would, we believe, allow China to begin deploying a fiber optics network by 1991. We estimate that China could not begin deploying and indigenously-developed system before 1995. []

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Satellites

China's development and use of communications satellites are progressing rapidly, but some problems have emerged. China plans to launch at least three communications satellites during the Seventh Five-Year Plan, but there are indications that the two already in orbit are malfunctioning. [REDACTED]

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[REDACTED] In addition, China wants to buy additional transponders on Intelsat. [REDACTED]

Beijing had planned to cancel all foreign satellite purchases, especially the direct broadcast satellite. Instead, the Chinese wanted to develop their own, less advanced satellite or build one using imported components and technology. They may now reconsider and reenter the international market for advanced systems. Moreover, Beijing may not buy technology for ground stations, opting to arrange joint ventures to assemble ground stations in China. [REDACTED]

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Foreign suppliers--who estimate the Chinese market in the next five years at \$3-5 billion--are scrambling to secure a foothold in the Chinese telecommunications market amid Chinese indications that their telecommunications purchases will eventually be limited. Central government concern about the compatibility of foreign equipment, for example, has led officials to try to limit the number of suppliers. Ministry of Post and Telecommunications officials apparently are considering limiting the number of foreign suppliers for switching equipment in Beijing and Shanghai. Beijing also is attempting to reduce costly duplication in technology imports. According to Chinese press reports, the Ministry of Machine Building is trying to limit the number of plants involved in fiber technology acquisition. Some officials have indicated, however, that China is looking for additional sources of technology--including Eastern Europe--to avoid dependence on any one supplier. [REDACTED]

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China is skillfully playing competitors off against one another to get more technology and better financial terms. [REDACTED]

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Japan is China's leading direct supplier of telecommunications equipment (see figure).¹ Japanese dominance is particularly strong in microwave technology. The Nippon Electric Company publicly claims to have installed a total of 4,700 km of microwave--at least 25 percent of China's microwave network--and to have won 80 percent of Chinese microwave orders in the last several years. According to data

¹ Data for Hong Kong sales of telecommunications equipment are largely reexports, with approximately 54 percent of those sales originating in Japan and 3 percent from the United States.

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[redacted]

published by China's trade partners, the value of Japanese sales to China in 1985 was five times greater than those of the United States, the second-largest supplier. The value of total European exports to China exceeds US sales, however, and individual European suppliers--particularly the United Kingdom, Canada, and West Germany--are narrowing the gap with the United States. [redacted]

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Outlook for China

Despite the willingness of foreign manufacturers to sell advanced equipment and technology, we believe several factors will slow Chinese progress in modernizing its telecommunications. The need for COCOM approval continues to delay the acquisition of technology. Cases currently on hold pending discussions among COCOM members include: a UK sale of a high-speed intercity fiber optics link; the second phase of the Belgian switching deal for the production of related integrated circuits; and a French sale of packet switching systems. The numerous Chinese entities involved in producing, buying, and using telecommunications equipment generate confusion over authority for planning and purchasing, duplication of purchases, and specifications needed. Funding problems may slow modernization as well. Chinese officials have publicly stated that they plan to spend \$3-4 billion on telecommunications modernization by 1990, and a total of \$15 billion by 2000. Post and Telecommunications officials are counting on local bureaucracies to provide two-thirds of the funds needed, but local entities traditionally resist investment in infrastructure, preferring revenue-producing industries. China also faces continuing problems in integrating foreign equipment into the existing network and in assimilating foreign technology. [redacted]

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Foreign purchases and indigenous efforts will contribute to improvements in China's telecommunications network, particularly in key projects. We believe the military, for example, will benefit from the increased speed, capacity, and flexibility offered by fiber optics and advanced switching. Nonetheless, we believe China's communications services will continue to be inadequate to support the demands of China's economic modernization. Problems in communications will continue to hinder commercial business transactions, cooperation between central and provincial organizations, and economic and social development of outlying regions. [redacted]

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Implications for the United States

US firms are at a disadvantage compared to their foreign competitors, who, with the support of their governments, are offering concessionary financing for Chinese telecommunications projects. Japan, France, and the United Kingdom all have offered credits or low-cost loans for telecommunications projects. The Belgian Government granted two soft loans valued at \$12 million and has a 10-percent ownership in the switching equipment joint venture; it extended another concessionary \$5 million loan for development projects in April 1986. According to press reports, Sweden is prepared to offer similar support to assist Ericsson in becoming China's third major switching technology supplier. [redacted]

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[REDACTED]

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In addition, US firms entered the Chinese market relatively late--Japan has been selling telecommunications equipment to China since at least the early 1970s. Statements by Chinese officials [REDACTED] suggest European suppliers such as France have also benefited from their government's longstanding political ties to Beijing. Moreover, American technology based on North American standards is less attractive to Beijing, which wants to adopt the standard used in Europe. [REDACTED]

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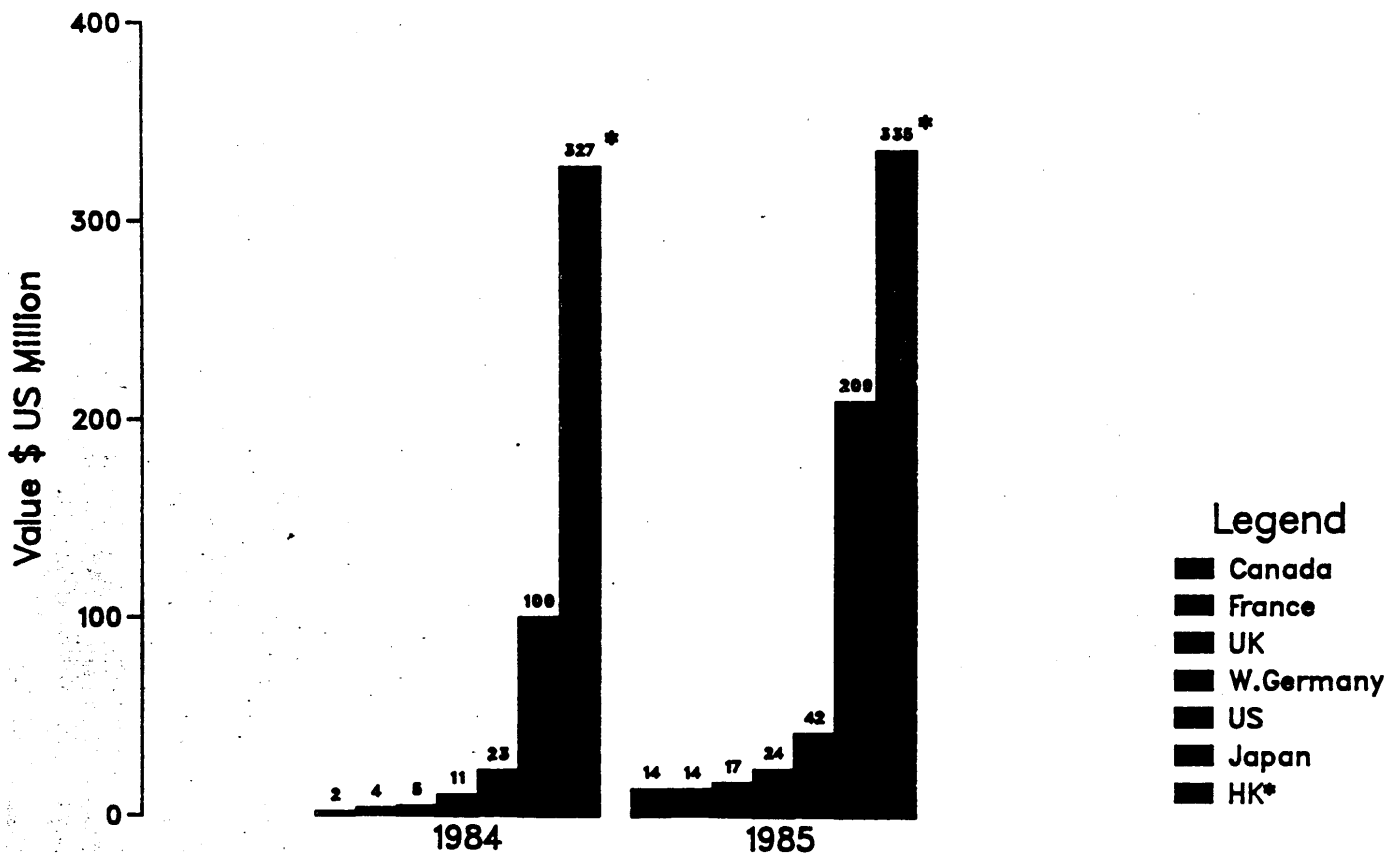
Chinese officials frequently express a preference for US technology, however, and US firms appear more willing to transfer technology than some foreign suppliers. In addition, US firms generally offer training and support services, both sought by the Chinese. We expect that Beijing--as well as US allies in COCOM--will continue to press the US Government to further loosen COCOM controls despite the liberalization in recent years. [REDACTED]

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Chinese Telecommunications Equipment Imports by Supplier



*Hong Kong data are largely re-exports, of which approximately 54% are from Japan, 4% are from the United States